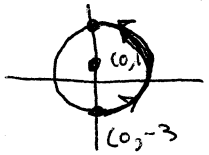
Math 1272 Quiz 5 March 6, 2014 Name SOLUTIONS

Time allow: 20 minutes

1.(25%) Find a parametric equation for the path of a particle that moves along the circle $x^2 + (y+1)^2 = 4$ halfway around counterclockwise, starting at $(0, -3)$.

$x = 2\cos\theta$

$y+1 = 2\sin\theta \Rightarrow y = 2\sin\theta - 1$



$-\frac{\pi}{2} \le \theta \le \frac{\pi}{2}$

2.(25%) Set up an integral that represents the area of the surface obtained by rotating the given curve about $y = -2$. Do not evaluate the integral.

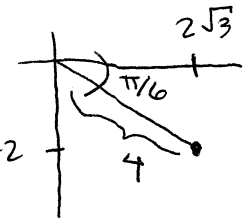
$$x = \sin t, \quad y = \sin 2t, \quad 0 \le t \le \frac{\pi}{4}$$

$$SA = \int_a^b 2\pi\,[\text{radius}]\,\sqrt{\left(\frac{dx}{dt}\right)^2 + \left(\frac{dy}{dt}\right)^2}\,dt$$

$$= \int_0^{\pi/4} 2\pi\,[\sin(2t) + 2]\,\sqrt{(\cos t)^2 + (2\cos 2t)^2}\,dt$$

PLEASE SEE THE OTHER SIDE FOR MORE PROBLEMS

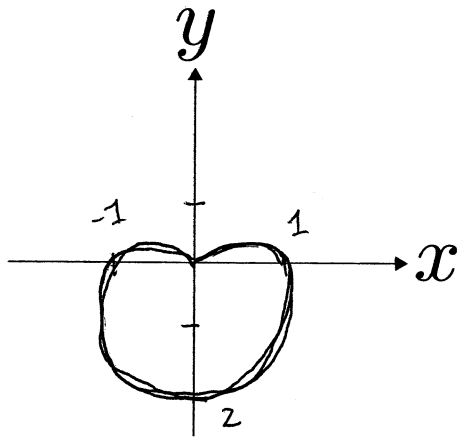
3. (20%) Find polar coordinates (r, θ) of the point $(x.y) = (2\sqrt{3}, -2)$,

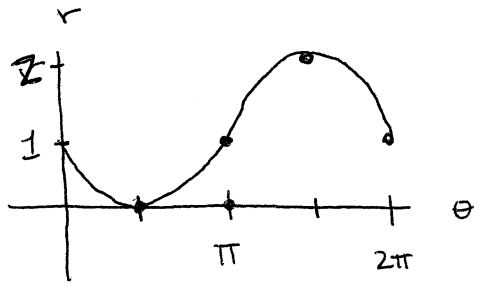


(i) where $r > 0$ and $0 \le \theta < 2\pi$; $(4, 11\pi/6)$

(ii) where $r < 0$ and $0 \le \theta < 2\pi$. $(-4, 5\pi/6)$

4. (30%) Graph the function $r = 1 - \sin\theta$ in polar coordinates.





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